

CLAIMS

What is claimed is:

1. A spinal fixation device comprising:

5 a connecting member having a female-tapered first through-passage formed therein, said connecting member having internal sidewalls defining said female-tapered first through-passage; and

10 a fastening member configured and dimensioned to penetrate and attach to a bone, said fastening member having a male-tapered external portion configured and dimensioned to matingly engage with the sidewalls defining the female-tapered first through-passage of the connecting member in a tapered locking fit to thereby lock said connecting member in position relative to the bone when said fastening member is attached to
15 the bone.

20 2. The spinal fixation device of claim 1, said connecting member further comprising a second through-passage defined by a sidewall, wherein the female tapered first through-passage tapers outwardly in a proximal-to-distal direction, and the sidewall of the second through-passage comprises threads.

3. The spinal fixation device of claim 1, wherein the male-tapered portion has a first end a second end and is longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said female-tapered first through-passage when said male-tapered portion is matingly engaged with the sidewalls defining the first through-passage in the tapered locking fit.

4. The spinal fixation device of claim 1, wherein the device further comprises a set screw and a screw driver, the screw driver being configured and dimensioned to accommodate and tighten both the fastening member and the set screw.

5. The spinal fixation device of claim 4, the set screw having an external hexagonal head portion, and the fastening member having a mid-collar, the mid-collar forming a hexagon that is substantially equivalent in size to said hexagonal head portion of said set screw.

6. The spinal fixation device of claim 1, wherein the device further comprises an elongate support member having a bend formed therein such that said elongate support member has a first, longer portion and a second, shorter portion.

7. The spinal fixation device of claim 6, wherein the connecting member further comprises a gripping member having a concave sidewall defining an aperture formed therethrough allowing the elongate support member to pass therethrough, wherein the gripping member grips said elongate support member and thereby locks said elongate support member in a location relative to the bone when said connecting member is in a clamped position.

8. The spinal fixation device of claim 7, wherein the device further comprises a stem member with a stem portion extending laterally therefrom, the stem member further having a concave sidewall defining a lateral through-passage for contactibly engaging the elongate support member, said stem member being freely rotatable along an axis of said elongate support member prior to being clamped to said elongate support member, wherein the connecting member may be selectively attached to said stem portion allowing the fastening member to be inserted polyaxially into the bone.

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9. The spinal fixation device of claim 1, wherein the connecting member further comprises an upper portion and a lower portion, said upper and lower portions each defining an

axis, wherein an angle is formed between the upper axis and the lower axis when the connecting member is in its natural state and no external forces are applied, said angle being greater than zero degrees.

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10. The spinal fixation device of claim 9, the connecting member further having an unlocked position and a locked position, wherein the connecting member remains in the unlocked position and has a limited degree of resiliency in maintaining its original shape to thereby enable the upper portion of said connecting member to be compressed toward the lower portion of said connecting member and into the locked position.

15 11. The spinal fixation device of claim 1, the male-tapered external portion of the fastening member having a female-threaded recess formed therein, said fastening member having sidewalls defining said recess, said male-tapered external portion being configured and dimensioned to mate with
20 the sidewalls defining the first through-passage in frictional engagement therewith.

12. The spinal fixation device of claim 11, the device further comprising an elongate support member and a fastener, the connecting member further comprising a second through-passage formed therein, wherein the connecting member being in
5 a locked position allows the fastener to be inserted through the second through-passage of the connecting member and into the first through-passage of the connecting member to thereby threadedly engage the sidewalls defining the female-threaded recess of the fastening member and thereby hold said
10 connecting member in a compression locked position upon the elongate support member.

13. The spinal fixation device of claim 1, the fastening member further comprising a first side and a second side with
15 a mid collar separating the first side from the second side, the second side being threaded for attaching the fastening member to the bone.

14. The spinal fixation device of claim 13, wherein the
20 length of the second side of the fastening member being at least three times the length of the first side.

15. The spinal fixation device of claim 1, wherein the device comprises a first elongate support member having a right-angle bend formed therein such that said support member assumes an "L" shape having a first, longer portion and a
5 second, shorter portion extending at a substantially right angle with respect to said longer portion.

16. The spinal fixation device of claim 1, the device having a disengaging means for disengaging and releasing the
10 tapered lock fit to thereby cause the release of said male-tapered external portion from said female-tapered first through-passage of the connecting member.

17. The spinal fixation device of claim 8, the device
15 having an aligning means for aligning the fastening member and the stem portion to thereby cause said fastening member to be positioned in a substantially orthogonal position with respect to said stem portion when said fastening member is attached to the bone.

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18. The spinal fixation device of claim 9, the lower portion being configured and dimensioned such that said lower portion is at least twice the thickness of the upper portion.

19. The spinal fixation device of claim 1, the device further comprising an elongate support member and a stem member having a stem portion, the elongate support member and the stem portion having equal diameters such that one
5 connecting member may be selectively attached to either of said elongate support member or said stem portion.

20. The spinal fixation device of claim 1, wherein the fastening member further comprises a head, said head being
10 formed collectively of a first head portion and a second head portion.

21. The spinal fixation device of claim 20, wherein the first head portion may be configured as a cylindrical portion
15 and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

22. The spinal fixation device of claim 21, wherein the first head portion has a recess formed therein.

23. The spinal fixation device of claim 20, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the

second head portion may be configured as a cylindrical portion.

24. The spinal fixation device of claim 23, wherein the
5 first head portion has a recess formed therein.

25. The spinal fixation device of claim 1, wherein the
fastening member further comprises a head, said head being
formed collectively of a first head portion and a second head
10 portion, both the first head portion and the second head
portion being tapered.

26. The spinal fixation device of claim 1, wherein the
fastening member further comprises a head, said head being
15 formed collectively of a first head portion and a second head
portion, both the first head portion and the second head
portion being substantially cylindrical.

27. A spinal fixation device comprising:
20 a connecting member having a female-tapered first
through-passage formed therein, said connecting member having
internal sidewalls defining said first through-passage, said
first through-passage tapering outwardly in a proximal-to-

distal direction, said connecting member further comprising a second through-passage formed therein; and

5 a fastening member configured and dimensioned to penetrate and attach to a bone, said fastening member having a male-tapered external portion that tapers outwardly in a proximal-to-distal direction, said male-tapered external portion having a female-threaded recess formed therein and being configured and dimensioned to mate with the sidewalls defining the female-tapered first through-passage in
10 frictional engagement therewith;

wherein the female-threaded recess is disposed in alignment with the second through-passage of the connecting member when the male-tapered external portion of the fastening member is disposed in engagement with the sidewalls defining
15 the female-tapered first through-passage of the connecting member, to thereby enable a fastener to pass through said second through-passage and into said female-threaded recess.

28. The spinal fixation device of claim 27, wherein the
20 male-tapered portion has a first end a second end and is longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said female-tapered first through-passage when said male-tapered

portion is matingly engaged with the sidewalls defining the first through-passage in frictional engagement.

29. The spinal fixation device of claim 27, wherein the
5 device further comprises an elongate support member, said elongate support member having a bend formed therein such that said elongate support member has a first, longer portion and a second, shorter portion.

10 30. The spinal fixation device of claim 29, wherein the connecting member further comprises a gripping member having a concave sidewall defining an aperture formed therethrough allowing the elongate support member to pass through said aperture, wherein said gripping member grips said elongate
15 support member and thereby locks said elongate support member in a location relative to the bone when said connecting member is in a clamped position.

31. The spinal fixation device of claim 27, the
20 fastening member further comprises a first side and a second side with a mid collar separating the first side from the second side, the second side being threaded for attaching the fastening member to the bone.

32. The spinal fixation device of claim 27, wherein the connecting member further comprises an upper portion and a lower portion, said upper and lower portions each defining an axis, wherein an angle is formed between the upper axis and the lower axis when the connecting member is in its natural state with no external forces being applied, said angle being greater than zero degrees.

33. The spinal fixation device of claim 32, the lower portion being configured and dimensioned such that said lower portion is at least twice the size of the upper portion.

34. The spinal fixation device of claim 27, the device further comprising an elongate support member and a stem member having a stem portion, the elongate support member and the stem portion having equal diameters such that one connecting member may be selectively attached to either of said elongate support member or said stem portion.

35. The spinal fixation device of claim 27, the device having a disengaging means for disengaging and releasing the frictional engagement to thereby cause the release of said

male-tapered external portion from said female-tapered first through-passage of the connecting member.

36. The spinal fixation device of claim 27, the device having a stem portion and an aligning means for aligning the fastening member and the stem portion to thereby cause said fastening member to be positioned in a substantially orthogonal position with respect to said stem portion when said fastening member is attached to the bone.

37. The spinal fixation device of claim 27, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion.

38. The spinal fixation device of claim 37, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

39. The spinal fixation device of claim 38, wherein the first head portion has a recess formed therein.

40. The spinal fixation device of claim 37, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

41. The spinal fixation device of claim 40, wherein the first head portion has a recess formed therein.

42. The spinal fixation device of claim 27, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

43. The spinal fixation device of claim 27, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being substantially cylindrical.

44. A spinal fixation device comprising:

a connecting member having a female-tapered first through-passage formed therein, said connecting member having internal sidewalls defining said first through-passage;

5 a fastening member configured and dimensioned to penetrate and attach to a bone, said fastening member having a male-tapered external portion configured and dimensioned to matingly engage with the sidewalls defining the female-tapered first through-passage of the connecting member in a tapered
10 locking fit; and

a disengaging means for disengaging and releasing the tapered lock fit to thereby cause the release of said male-tapered external portion from said female-tapered first through-passage of the connecting member.

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45. The spinal fixation device of claim 44, wherein the male-tapered portion has a first end a second end and is longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said
20 female-tapered first through-passage when said male-tapered portion is matingly engaged with the sidewalls defining the first through-passage in the tapered locking fit.

46. The spinal fixation device of claim 44, wherein the device further comprises an elongate support member, said support member having a bend formed therein such that said elongate support member has a first, longer portion and a
5 second, shorter portion.

47. The spinal fixation device of claim 46, wherein the connecting member further comprises a gripping member having a concave sidewall defining an aperture formed therethrough
10 allowing the elongate support member to pass through said aperture, wherein said gripping member grips said elongate support member and thereby locks said elongate support member in a location relative to the bone when said connecting member is in a clamped position.

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48. The spinal fixation device of claim 44, the fastening member further comprises a first side and a second side with a mid collar separating the first side from the second side, the second side being threaded for attaching the
20 fastening member to the bone.

49. The spinal fixation device of claim 44, wherein the connecting member further comprises an upper portion and a

lower portion, said upper and lower portions each defining an axis, wherein an angle is formed between the upper axis and the lower axis when the connecting member is in its natural state with no external forces being applied, said angle being
5 greater than zero degrees.

50. The spinal fixation device of claim 49, the lower portion being configured and dimensioned such that said lower portion is at least twice the size of the upper portion.

51. The spinal fixation device of claim 44, the device further comprising an elongate support member and a stem member having a stem portion, the elongate support member and the stem portion having equal diameters such that one
15 connecting member may be selectively attached to either said elongate support member or said stem portion.

52. The spinal fixation device of claim 44, the device further comprising a fastener and the connecting member
20 further comprising a second through passage, wherein the first through passage and the second through passage may be aligned such that the fastener may pass through the second through passage and into a recess formed in the male-tapered portion

when the fastening member is engaged with the connecting member in the tapered locking fit.

53. The spinal fixation device of claim 44, the device
5 having a stem portion and an aligning means for aligning the fastening member and the stem portion to thereby cause said fastening member to be positioned in a substantially orthogonal position with respect to said stem portion when said fastening member is attached to the bone.

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54. The spinal fixation device of claim 44, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion.

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55. The spinal fixation device of claim 54, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

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56. The spinal fixation device of claim 55, wherein the first head portion has a recess formed therein.

57. The spinal fixation device of claim 54, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

58. The spinal fixation device of claim 57, wherein the first head portion has a recess formed therein.

59. The spinal fixation device of claim 44, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

60. The spinal fixation device of claim 44, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being substantially cylindrical.

61. A spinal fixation device comprising:

a fastening member configured and dimensioned to penetrate and attach to a bone;

spinal fixation structure configured and dimensioned to
5 extend from a first vertebral body to a second vertebral body,
said spinal fixation structure further comprising an elongate
stem member; and

aligning means for aligning the fastening member and the
elongate stem member to thereby cause said fastening member to
10 be positioned in a substantially orthogonal position with
respect to said elongate stem member when said fastening
member is attached to the bone.

62. The spinal fixation device of claim 61, wherein the
15 fixation structure further comprises a female-tapered first
through-passage, said fixation structure having internal
sidewalls defining said first through-passage, and the
fastening member comprises a male-tapered external portion
configured and dimensioned to matingly engage with the
20 sidewalls defining said first through-passage of the fixation
structure in a tapered locking fit to thereby lock said
fixation structure in position relative to the bone when said
fastening member is attached to the bone.

63. The spinal fixation device of claim 62, the device having a disengaging means for disengaging and releasing the tapered lock fit to thereby cause the release of said male-tapered external portion from said female-tapered first through-passage of the spinal fixation structure.

64. The spinal fixation device of claim 61, the spinal fixation structure further comprising an elongate support member, said support member having a bend formed therein such that said support member has a first, longer portion and a second, shorter portion.

65. The spinal fixation device of claim 61, wherein said elongate stem member comprises an upper portion and a lower portion with a stem portion extending laterally from said upper portion, said upper portion further having a first through-passage formed therein, and said lower portion further having a second through-passage formed therein such that a fastener may be inserted through the first through-passage engaging the second through-passage to cause a clamping action bringing said upper portion and said lower portion together.

66. The spinal fixation device of claim 65, wherein said elongate stem member further comprises a concave sidewall defining a lateral through-passage wherein an elongate support member may pass prior to the clamping action occurring such that the elongate support member may be locked in the lateral through-passage.

67. The spinal fixation device of claim 62 wherein the male-tapered portion has a first end a second end and is longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said female-tapered first through-passage when said male-tapered portion is matingly engaged with the sidewalls defining the first through-passage in the tapered locking fit.

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68. The spinal fixation device of claim 61, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion.

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69. The spinal fixation device of claim 68, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

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70. The spinal fixation device of claim 69, wherein the first head portion has a recess formed therein.

71. The spinal fixation device of claim 68, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

72. The spinal fixation device of claim 71, wherein the first head portion has a recess formed therein.

73. The spinal fixation device of claim 61, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

74. The spinal fixation device of claim 61, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head
5 portion being substantially cylindrical.

75. A spinal fixation device comprising:

spinal fixation structure configured and dimensioned to extend from a first vertebral body to a second vertebral body,
10 said fixation structure having a female-tapered first through-passage formed therein, said fixation structure having internal sidewalls defining said first through-passage; and

a fastening member configured and dimensioned to penetrate and attach to a bone, said fastening member having
15 a male-tapered external portion configured and dimensioned to matingly engage with the sidewalls defining the female-tapered first through-passage of the fixation structure in a tapered locking fit to thereby lock said fixation structure in position relative to the bone when said fastening member is
20 attached to the bone.

76. The spinal fixation device of claim 75, wherein the male-tapered portion has a first end a second end and is

longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said female-tapered first through-passage when said male-tapered portion is matingly engaged with the sidewalls defining the first through-passage in the tapered locking fit.

77. The spinal fixation device of claim 75, wherein the spinal fixation structure further comprises an elongate support member, said support member having a bend formed therein such that said support member has a first, longer portion and a second, shorter portion.

78. The spinal fixation device of claim 77, wherein the spinal fixation structure further comprises a connecting member, said connecting member further comprises a gripping member having a concave sidewall defining an aperture formed therethrough allowing the elongate support member to pass through said aperture, wherein said gripping member grips said elongate support member and thereby locks said elongate support member in a location relative to the bone when said connecting member is in a clamped position.

79. The spinal fixation device of claim 75, the fastening member further comprises a first side and a second side with a mid collar separating the first side from the second side, the second side being threaded for attaching the fastening member to the bone.

80. The spinal fixation device of claim 75, wherein the spinal fixation structure further comprises a connecting member, said connecting member further comprises an upper portion and a lower portion, said upper and lower portions each defining an axis, wherein an angle is formed between the upper axis and the lower axis when the connecting member is in its natural state with no external forces being applied, said angle being greater than zero degrees.

81. The spinal fixation device of claim 80, the lower portion being configured and dimensioned such that said lower portion is at least twice the size of the upper portion.

82. The spinal fixation device of claim 80, the device further comprising an elongate support member and a stem member having a stem portion, the elongate support member and the stem portion having equal diameters such that one

connecting member may be selectively attached to either said elongate support member or said stem portion.

83. The spinal fixation device of claim 75, the device
5 having a disengaging means for disengaging and releasing the tapered lock fit to thereby cause the release of said male-tapered external portion from said female-tapered first through-passage of the spinal fixation structure.

10 84. The spinal fixation device of claim 75, the device further having a stem portion and an aligning means for aligning the fastening member and the stem portion to thereby cause said fastening member to be positioned in a substantially orthogonal position with respect to said stem
15 portion when said fastening member is attached to the bone.

85. The spinal fixation device of claim 75, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head
20 portion.

86. The spinal fixation device of claim 85, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

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87. The spinal fixation device of claim 86, wherein the first head portion has a recess formed therein.

88. The spinal fixation device of claim 85, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

89. The spinal fixation device of claim 88, wherein the first head portion has a recess formed therein.

90. The spinal fixation device of claim 75, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

91. The spinal fixation device of claim 75, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head
5 portion being substantially cylindrical.

92. A spinal fixation device comprising:

a connecting member having a female-tapered first through-passage formed therein, said connecting member having
10 internal sidewalls defining said first through-passage; and

an attaching means for penetrating and attaching the spinal fixation device to a bone, said attaching means having a male-tapered external portion configured and dimensioned to matingly engage with the sidewalls defining the female-tapered
15 first through-passage of the connecting member in a tapered locking fit to thereby lock said connecting member in position relative to the bone when said attaching means is attached to the bone.

20 93. The spinal fixation device of claim 92, wherein the male-tapered portion has a first end a second end and is longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said

female-tapered first through-passage when said male-tapered portion is matingly engaged with the sidewalls defining the first through-passage in the tapered locking fit.

5 94. The spinal fixation device of claim 92, wherein the device further comprises an elongate support member, said elongate support member having a bend formed therein such that said elongate support member has a first, longer portion and a second, shorter portion.

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 95. The spinal fixation device of claim 94, wherein the connecting member further comprises a gripping member having a concave sidewall defining an aperture formed therethrough allowing the elongate support member to pass through said aperture, wherein said gripping member grips said elongate support member and thereby locks said elongate support member in a location relative to the bone when said connecting member is in a clamped position.

20 96. The spinal fixation device of claim 92, wherein the attaching means further comprises a first side and a second side with a mid collar separating the first side from the

second side, the second side being threaded for advancing the attaching means into the bone.

97. The spinal fixation device of claim 93, wherein the
5 connecting member further comprises an upper portion and a
lower portion, said upper and lower portions each defining an
axis, wherein an angle is formed between the upper axis and
the lower axis when the connecting member is in its natural
state with no external forces being applied, said angle being
10 greater than zero degrees.

98. The spinal fixation device of claim 97, the lower
portion being configured and dimensioned such that said lower
portion is at least twice the size of the upper portion.

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99. The spinal fixation device of claim 92, the device
further comprising an elongate support member and a stem
member having a stem portion, the elongate support member and
the stem portion having equal diameters such that one
20 connecting member may be selectively attached to either said
elongate support member or said stem portion.

100. The spinal fixation device of claim 92, the device having a disengaging means for disengaging and releasing the tapered lock fit to thereby cause the release of said male-tapered external portion from said female-tapered first through-passage of the connecting member.

101. The spinal fixation device of claim 92, the device having a stem portion and an aligning means for aligning the attaching means and the stem portion to thereby cause said attaching means to be positioned in a substantially orthogonal position with respect to said stem portion when said attaching means is attached to the bone.

102. The spinal fixation device of claim 92, wherein the attaching means further comprises a head, said head being formed collectively of a first head portion and a second head portion.

103. The spinal fixation device of claim 102, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

104. The spinal fixation device of claim 103, wherein the first head portion has a recess formed therein.

105. The spinal fixation device of claim 102, wherein
5 the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

106. The spinal fixation device of claim 105, wherein
10 the first head portion has a recess formed therein.

107. The spinal fixation device of claim 92, wherein the attaching means further comprises a head, said head being
15 formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

108. The spinal fixation device of claim 92, wherein the
20 attaching means further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being substantially cylindrical.

109. A spinal fixation device comprising:

an elongate support member;

attaching means for attaching the spinal fixation device to at least one human vertebra of the spine, the attaching means having a male-tapered external portion, said male-tapered external portion having a recess formed therein, said attaching means having internal sidewalls defining said recess;

connecting means for connecting the elongate support member to the attaching means, the connecting means having a female-tapered first through-passage formed therein, said connecting member having internal sidewalls defining said first through-passage, said first through-passage tapering outwardly in a proximal-to-distal direction, said connecting means further comprising a second through-passage formed therein, said male-tapered external portion of the attaching means being configured and dimensioned to mate with the sidewalls defining the first through-passage in frictional engagement therewith; and

a fastener for passing through the second through-passage and engaging the sidewalls defining the recess of the attaching means when the attaching means and the connecting means are in frictional engagement to thereby compress the

connecting means such that the elongate support member may be locked into position in relation to the bone.

110. The spinal fixation device of claim 109, wherein
5 the male-tapered portion has a first end a second end and is longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said female-tapered first through-passage when said male-tapered portion is matingly engaged with the sidewalls defining the
10 first through-passage in frictional engagement.

111. The spinal fixation device of claim 109, wherein the elongate support member has a bend formed therein such that said elongate support member has a first, longer portion
15 and a second, shorter portion.

112. The spinal fixation device of claim 109, wherein the connecting means further comprises a gripping member having a concave sidewall defining an aperture formed
20 therethrough allowing the elongate support member to pass through said aperture, wherein said gripping member grips said elongate support member and thereby locks said elongate

support member in a location relative to the bone when said connecting means is in a clamped position.

113. The spinal fixation device of claim 109, wherein
5 the elongate support member has a right-angle bend formed therein such that said support member assumes an "L" shape having a first, longer portion and a second, shorter portion extending at a substantially right angle with respect to said longer portion.

114. The spinal fixation device of claim 109, wherein
10 the attaching means further comprises a first side and a second side with a mid collar separating the first side from the second side, the second side being threaded for advancing
15 the attaching means into the bone.

115. The spinal fixation device of claim 109, wherein
the connecting means further comprises an upper portion and a lower portion, said upper and lower portions each defining an
20 axis, wherein an angle is formed between the upper axis and the lower axis when the connecting means is in its natural state with no external forces being applied, said angle being greater than zero degrees.

116. The spinal fixation device of claim 115, the lower portion being configured and dimensioned such that said lower portion is at least twice the size of the upper portion.

5 117. The spinal fixation device of claim 109, the device further comprises a stem member having a stem portion, the elongate support member and the stem portion having equal diameters such that a single connecting means may be selectively attached to either said elongate support member or
10 said stem portion.

118. The spinal fixation device of claim 109, the device having a disengaging means for disengaging and releasing the frictional engagement to thereby cause the release of said
15 male-tapered external portion from said female-tapered first through-passage of the connecting means.

119. The spinal fixation device of claim 109, the device having a stem portion and an aligning means for aligning the
20 attaching means and the stem portion to thereby cause said attaching means to be positioned in a substantially orthogonal position with respect to said stem portion when said attaching means is attached to the bone.

120. The spinal fixation device of claim 109, wherein the attaching means further comprises a head, said head being formed collectively of a first head portion and a second head portion.

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121. The spinal fixation device of claim 120, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

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122. The spinal fixation device of claim 120, wherein the first head portion has a recess formed therein.

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123. The spinal fixation device of claim 120, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

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124. The spinal fixation device of claim 123, wherein the first head portion has a recess formed therein.

125. The spinal fixation device of claim 109, wherein the attaching means further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

126. The spinal fixation device of claim 109, wherein the attaching means further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being substantially cylindrical.

127. A spinal fixation device comprising:

an elongate support member, the elongate support member having a bend formed therein such that said elongate support member has a first, longer portion and a second, shorter portion;

attaching means for attaching the spinal fixation device to a human vertebra of the spine, the attaching means having a first end and a second end, the first end having a male external taper with a female recess formed therein, said attaching means having internal sidewalls defining said recess;

connecting means for connecting the elongate support member to the attaching means, the connecting means comprising a lower portion and an upper portion, the lower portion having a first through-passage with a female internal taper formed therein, said connecting means having internal sidewalls defining said first through-passage such that the male external taper mates with the sidewalls defining the first through-passage in frictional engagement therewith, and the upper portion having a second through-passage; and

a fastener for passing through the second through-passage and engaging the sidewalls defining the recess of the attaching means when the attaching means and the connecting means are in frictional engagement to thereby compress the connecting means such that the elongate support member may be locked into position in relation to the bone.

128. The spinal fixation device of claim 127, wherein the male-tapered portion has a first end a second end and is longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said female-tapered first through-passage when said male-tapered portion is matingly engaged with the sidewalls defining the first through-passage in frictional engagement.

129. The spinal fixation device of claim 127, wherein the connecting means further comprises a gripping member having a concave sidewall defining an aperture formed therethrough allowing the elongate support member to pass
5 through said aperture, wherein said gripping member grips said elongate support member and thereby locks said elongate support member in a location relative to the bone when said connecting means is in a clamped position.

10 130. The spinal fixation device of claim 127, wherein the elongate support member has a right-angle bend formed therein such that said support member assumes an "L" shape forming the first, longer portion and the second, shorter portion extending at a substantially right angle with respect
15 to said longer portion.

131. The spinal fixation device of claim 127, wherein the first end and the second end are separated by a mid collar, the second end being threaded for advancing the
20 attaching means into the bone.

132. The spinal fixation device of claim 127, wherein the upper and lower portions each define an axis, wherein an

angle is formed between the upper axis and the lower axis when the connecting means is in its natural state with no external forces being applied, said angle being greater than zero degrees.

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133. The spinal fixation device of claim 127, the lower portion being configured and dimensioned such that said lower portion is at least twice the size of the upper portion.

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134. The spinal fixation device of claim 127, the device further comprises a stem member having a stem portion, the elongate support member and the stem portion having equal diameters such that a single connecting means may be selectively attached to either said elongate support member or

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said stem portion.

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135. The spinal fixation device of claim 127, the device having a disengaging means for disengaging and releasing the frictional engagement to thereby cause the release of said male external taper from said female internal taper of the first through-passage.

136. The spinal fixation device of claim 127, the device having a stem portion and an aligning means for aligning the attaching means and the stem portion to thereby cause said attaching means to be positioned in a substantially orthogonal position with respect to said stem portion when said attaching means is attached to the bone.

137. The spinal fixation device of claim 127, wherein the attaching means further comprises a head, said head being formed collectively of a first head portion and a second head portion.

138. The spinal fixation device of claim 137, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

139. The spinal fixation device of claim 138, wherein the first head portion has a recess formed therein.

140. The spinal fixation device of claim 137, wherein the first head portion may be configured as a tapered portion

and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

5 141. The spinal fixation device of claim 140, wherein the first head portion has a recess formed therein.

10 142. The spinal fixation device of claim 127, wherein the attaching means further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

15 143. The spinal fixation device of claim 127, wherein the attaching means further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being substantially cylindrical.

20 144. A spinal fixation device comprising:
a connecting member having a female-tapered first through-passage formed therein, said connecting member further having internal sidewalls defining said first through-passage,

said first through-passage tapering outwardly in a proximal-to-distal direction, said connecting member further comprising a second through-passage formed therein, the first through-passage and the second through-passage being configured and dimensioned to define a first axis and a second axis, respectively, wherein said first and second axes are not co-linear, and together cooperatively form an angle greater than zero degrees; and

a fastening member configured and dimensioned to penetrate a pedicle, said fastening member having a male-tapered external portion that tapers outwardly in a proximal-to-distal direction, said male-tapered external portion having a female-threaded recess formed therein and being configured and dimensioned to mate with the sidewalls defining the first through-passage in frictional engagement therewith;

wherein the female-threaded recess is disposed in alignment with the second through-passage of the connecting member when the male-tapered external portion of the fastening member is disposed in engagement with the first through-passage of the connecting member, to thereby enable a fastener to pass through said second through-passage and into said female-threaded recess.

145. The spinal fixation device of claim 144, wherein the male-tapered portion has a first end a second end and is longer than the female-tapered first through-passage such that the second end of the male-tapered portion extends beyond said female-tapered first through-passage when said male-tapered portion is matingly engaged with the sidewalls defining the first through-passage in frictional engagement.

146. The spinal fixation device of claim 144, wherein the device further comprises an elongate support member, said support member having a bend formed therein such that said elongate support member has a first, longer portion and a second, shorter portion.

147. The spinal fixation device of claim 146, wherein the connecting member further comprises a gripping member having a concave sidewall defining an aperture formed therethrough allowing the elongate support member to pass through said aperture, wherein said gripping member grips said elongate support member and thereby locks said elongate support member in a location relative to the bone when said connecting member is in a clamped position.

148. The spinal fixation device of claim 144, the fastening member further comprises a first side and a second side with a mid collar separating the first side from the second side, the second side being threaded for attaching the fastening member to the bone.

149. The spinal fixation device of claim 144, wherein the connecting member further comprises a lower portion and an upper portion, the lower portion being configured and dimensioned such that said lower portion is at least twice the size of the upper portion.

150. The spinal fixation device of claim 144, the device further comprises an elongate support member and a stem member having a stem portion, the elongate support member and the stem portion having equal diameters such that one connecting member may be selectively attached to either said elongate support member or said stem portion.

151. The spinal fixation device of claim 144, the device having a disengaging means for disengaging and releasing the frictional engagement to thereby cause the release of said

male-tapered external portion from said female-tapered first through-passage of the connecting member.

152. The spinal fixation device of claim 144, the device
5 having a stem portion and an aligning means for aligning the fastening member and the stem portion to thereby cause said fastening member to be positioned in a substantially orthogonal position with respect to said stem portion when said fastening member is attached to the bone.

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153. The spinal fixation device of claim 144, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion.

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154. The spinal fixation device of claim 153, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered
20 portion.

155. The spinal fixation device of claim 154, wherein the first head portion has a recess formed therein.

156. The spinal fixation device of claim 153, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical
5 portion.

157. The spinal fixation device of claim 156, wherein the first head portion has a recess formed therein.

10 158. The spinal fixation device of claim 144, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

15 159. The spinal fixation device of claim 144, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head
20 portion being substantially cylindrical.

160. A method of interconnecting a plurality of bone segments comprising the steps of:

inserting a plurality of fastening members into a plurality of bone segments, respectively, wherein at least one of the fastening members includes a male-tapered portion;

selecting an intercoupling means, said intercoupling
5 means having a female-tapered first through-passage formed therein defined by internal sidewalls;

intercoupling the fastening members with the intercoupling means and engaging the internal sidewalls of the first through-passage of said intercoupling means with the
10 male-tapered portion of the fastening member in a static, frictional engagement.

161. A method of interconnecting a plurality of bone segments of claim 160 wherein the fastening member further
15 comprises threads for insertion into the bone segments.

162. The method of interconnecting a plurality of bone segments of claim 160, wherein the fastening member further comprises a head, said head being formed collectively of a
20 first head portion and a second head portion.

164. The method of interconnecting a plurality of bone segments of claim 162, wherein the first head portion may be

configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

5 164. The method of interconnecting a plurality of bone segments of claim 163, wherein the first head portion has a recess formed therein.

10 165. The method of interconnecting a plurality of bone segments of claim 162, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

15 166. The method of interconnecting a plurality of bone segments of claim 165, wherein the first head portion has a recess formed therein.

20 167. The method of interconnecting a plurality of bone segments of claim 160, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

168. The method of interconnecting a plurality of bone segments of claim 160, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first
5 head portion and the second head portion being substantially cylindrical.

169. The method of interconnecting a plurality of bone segments of claim 160 wherein the female-tapered sidewalls of
10 the first through-passage of said intercoupling means are engaged with the male-tapered portion of the fastening member in a morse taper locking fit.

170. The method of interconnecting a plurality of bone
15 segments of claim 160 wherein the intercoupling means comprises a C-clamp having a first, upper portion and a second, lower portion.

171. The method of interconnecting a plurality of bone
20 segments of claim 160, the method further comprises the step of locating a stem member on an elongate support member, said stem member having a stem portion, such that the fastening

member and the stem portion are located at a substantial ninety-degree angle relative to one another.

172. The method of interconnecting a plurality of bone segments of claim 171, the method further comprises the step of positioning the stem member and the elongate support member on a patient's spine, such that the fastening member and the intercoupling means may be attached to said stem member and said elongate support member.

173. The method of interconnecting a plurality of bone segments of claim 160, the method further comprises the step of locating a first reference instrument on the fastening member, such that the fastening member may be advanced, wherein the advancing of the fastening member is accomplished by the first reference instrument.

174. The method of interconnecting a plurality of bone segments of claim 160, wherein the static, frictional engagement may be disengaged by a distractor device having a first side, said first side being configured and dimensioned for disengaging the static, frictional engagement.

175. A method of attaching a spinal fixation device to the spinal region comprising the steps of:

inserting a plurality of fastening members into the bone of the spine, the fastening members each having a male-tapered
5 portion;

attaching a connecting member to an elongate support member, said connecting member having a female-tapered first through-passage formed therein defined by internal sidewalls;
and

10 attaching the connecting member to the fastening member by engaging the internal sidewalls of the first through-passage of the connecting member with the male-tapered portion of the fastening member in a static, frictional engagement.

15 176. The method of attaching a spinal fixation device to the spinal region of claim 175 wherein the fastening member further comprises threads for insertion into the bone of the spine.

20 177. The method of attaching a spinal fixation device to the spinal region of claim 175, wherein the female-tapered sidewalls of the first through-passage of said connecting

member are engaged with the male-tapered portion of the fastening member in a morse taper locking fit.

178. The method of interconnecting a plurality of bone
5 segments of claim 175, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion.

179. The method of interconnecting a plurality of bone
10 segments of claim 178, wherein the first head portion may be configured as a cylindrical portion and formed on top of the second head portion, and wherein the second head portion may be configured as a tapered portion.

180. The method of interconnecting a plurality of bone
15 segments of claim 179, wherein the first head portion has a recess formed therein.

181. The method of interconnecting a plurality of bone
20 segments of claim 178, wherein the first head portion may be configured as a tapered portion and formed on top of the second head portion, and wherein the second head portion may be configured as a cylindrical portion.

182. The method of interconnecting a plurality of bone segments of claim 181, wherein the first head portion has a recess formed therein.

5 183. The method of interconnecting a plurality of bone segments of claim 175, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being tapered.

10 184. The method of interconnecting a plurality of bone segments of claim 175, wherein the fastening member further comprises a head, said head being formed collectively of a first head portion and a second head portion, both the first head portion and the second head portion being substantially cylindrical.

185. A method of attaching a spinal fixation device to the spinal region comprising the steps of:

20 inserting a plurality of fastening members into the bone of the spine, the fastening members each having a male-tapered head with a threaded recess formed therein, exposing the male-tapered head;

connecting a first connecting member to an elongate support member, the first connecting member having a female-tapered first through-passage formed therein, said first connecting member having internal sidewalls defining said first through-passage, and connecting at least one stem member to the elongate support member;

attaching the elongate support member to one of the plurality of fastening members by engaging the male-tapered head of the fastening member with the sidewalls defining the first through-passage of the first connecting member creating a locking fit;

inserting a fastener through the through-passage of the first connecting member and into the threaded recess of one of the plurality of fastening members causing threaded engagement; and

attaching the stem member to another one of the plurality of fastening members by connecting a second connecting member to the stem member, engaging the locking fit between said second connecting member and said another one of the plurality of fastening members, and inserting a second fastener.

186. A method of detaching two engaged portions of a bone interconnecting system comprising the steps of:

identifying a bone interconnecting system secured to a plurality of bone segments, wherein the system includes a first portion having a male-tapered surface and a second portion having a female-tapered surface disposed in a static, frictional engagement with the male-tapered surface;

attaching a distractor device to one of the first portion and second portion of the interconnecting system, and moving a portion of said distractor device into contact with the other of said first portion and second portion to thereby break the static, frictional engagement between said first portion and second portion to enable said first portion and said second portion to be separated from each other.

187. A method of interconnecting a plurality of bone segments comprising the steps of:

locating a pre-implanted fastening member that has been previously inserted into a bone segment;

locating a moveable stem portion of a pre-implanted bone interconnecting system, said stem portion extending from a stem member of the interconnecting system;

placing a first reference instrument onto the fastening member, wherein said first reference instrument includes a first reference indicator;

placing a second reference instrument on the stem member of the interconnecting system, wherein said second reference instrument includes a second reference indicator;

5 advancing the fastening member further into the bone segment and thereby advancing the first reference indicator until said first reference indicator moves into alignment with the second reference indicator; and

connecting the stem portion with the fastening member.

10 188. The method of interconnecting a plurality of bone segments of claim 187 wherein the fastening member and the stem portion are located at a substantial ninety-degree angle relative to one another.

15 189. The method of interconnecting a plurality of bone segments of claim 187 wherein the advancing of the fastening member is accomplished by the first reference instrument.

20 190. A method of interconnecting a plurality of bone segments comprising the steps of:

inserting a fastening member configured and dimensioned to penetrate and attach to a bone;

locating a spinal fixation structure configured and dimensioned to extend from a first vertebral body to a second vertebral body, said spinal fixation structure further comprising an elongate stem member; and

5 positioning aligning means on the fastening member and the stem member for aligning the fastening member and the stem member to thereby cause said fastening member to be positioned in a substantially orthogonal position with respect to said stem member when said fastening member is attached to the
10 bone.